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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of
Michael Antoine Joseph Caroline BELL et al.
Serial No.: 10/522,471
Filed: May 26, 2005
For: SEAL ASSEMBLY

Confirmation No.: 3667
Date: October 29, 2008
Group Art Unit: 3673
Examiner: Alison K. Pickard

VIA EFS-WEB
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

APPEAL BRIEF UNDER 37 C.F.R. §41.37

Sir:

This appeal is taken from the Office Action mailed May 29, 2008. In support of the Notice of Appeal filed August 29, 2008, the present Appeal Brief is presented.

I. Real Party in Interest

The real parties in interest are the assignees TECHNIP FRANCE SA and TECHNIP OFFSHORE UK LIMITED.

II. Related Appeals and Interferences

The applicants, the assignees and the undersigned attorney are not aware of any related appeals and interferences.

III. Status of Claims

Claims 1-3 and 14-16 stand rejected and are pending and on appeal herein. Claims 5-13 have been objected to and claims 4 and 17-18 have been canceled.

IV. Status of Amendments

A Response to a final Office Action dated September 17, 2008 was filed on March 3, 2008 and included amendments to the claims 1-3, 5, 6, 9, and 14. Thereafter, a Request For Continued Examination was filed on March 14, 2008. The claims in the Appendix attached hereto reflect the current state of all claims. An Office Action issued on May 29, 2008 in which claims 1-3 and 14-16 were rejected and claims 5-13 were objected to. Applicant's filed a Notice of Appeal on August 29, 2008. No amendments to the claims have been made since the Response to the Final Office Action filed on March 3, 2008.

V. Summary of Claimed Subject Matter

Independent claim 1 relates to a seal assembly (*See seal assembly 1 of Fig. 1a and page 5, lines 26-28, for example*) including an inner pipe and an outer pipe in a double- walled subsea pipeline (*See Figs. 1b and 1c, page 7, lines 6-8 and page 9, lines 12-13, for example*), wherein the inner pipe has a normal operating condition wherein it is connected and operable for transmitting a hydrocarbon through the inner pipe (*See page 1, lines 1-2, for example*); an annular space formed between the inner pipe and the outer pipe (*See Figs. 1b-1c and page 6, lines 12-15, for example*) wherein the annular space has a normal operating condition wherein it is connected and operable for permitting gas to pass through the annular space (*See Fig. 1b and page 7, lines 6-12, for example*); and a seal in the annular space and operable for sealing the annular space, wherein the seal under the normal operating conditions of the inner pipe and the annular space is in a non-sealing position which allows passage of a gas through the seal assembly (*See Fig. 1b, page 3, lines 24-29 and page 7 line 29 to page 8, line 1, for example*); and wherein under the normal operating conditions of the inner pipe and the annular space, the seal is actuatable from the non-sealing position to a sealing position in response to entry of liquid into the annular space (*See Fig. 1b and page 3, lines 29-32, and Fig. 1c and page 9, lines 1-17, for example*).

VI. Grounds of Rejection to be Reviewed

The following grounds of rejection are presented for review:

1. Whether claims 1-3 and 14-16 were correctly rejected under 35 U.S.C. §103(a) as being unpatentable over the published article "Innovations Key Reeled Pipe-In-Pipe Flow Line" (hereinafter the "Innovations Article") in view of U.S. Patent No. 7,059,410 to Bousche.

2. Whether claims 5-13 were correctly objected to as being based on rejected claims.

VII. Argument

Rejection of Claims 1-3 and 14-16 under 35 U.S.C. § 103

Claims 1-3 and 14-16 stand rejected under 35 U.S.C. § 103 as allegedly being unpatentable over the Innovations Article in view of Bousche.

The Examiner argues that the Innovations Article discloses a double-walled pipeline with seal in the annular space between the pipes. The Examiner further argues that the inner pipe has a normal operating condition and is capable of transmitting gas. The Examiner also argues that the annular space is also considered capable of allowing gas flow. This is clearly incorrect.

It is clear in light of both the previously filed Declaration under 37 C.F.R. §1.132 of Sylvain Denniel, who is one of the authors of the Innovations Article and in light of the Examiner's own statements at page 2 of the May 29, 2008 Office Action, that the seals described in the Innovations Article do not allow gas to pass through the annular space during normal operation. Thus, the Examiner's argument that the seals are capable of transmitting gas is clearly unsupported since the seals do not do so, and there is no suggestion that they could.

Mr. Denniel's Declaration makes it quite clear that the seals described in the Innovations Article and used in the Nile pipeline, during normal operation, span the entire annular space and thus do not allow transfer of gas. There is no mention whatsoever of gas flow in the annular space at all in the Innovations Article. In short the Innovations Article simply does not contemplate migration of gas along the annular space or past the water stops and provides no

structure to enable that. The Examiner even admits at page 2 of the Office Action that the Innovations Article does not disclose that the seals allow for the transfer of gas under normal operating conditions. In light of this, there is absolutely no support for the Examiner's assertion that the seals could allow for gas transfer. In fact, all of the evidence and the Examiner's own statements make clear that the seals in the Innovations Article do not allow for gas transfer under normal operating conditions.

The Examiner further argues, however, that Bousche discloses an installation technique that binds a seal until it is needed. The Examiner concludes that since the seal isn't needed until water is present, the binding taught by Bousche would not need to be removed until that time. Thus, the Examiner concludes that the Bousche seal would permit gas to pass during normal operation. The Examiner further argues that it would have been obvious to one of ordinary skill in the art to combine the seal of Bousche with the pipeline of the Innovations Article to yield the limitations of claim 1. This is clearly incorrect.

As was explained in Applicant's previous response, the tape 25 in Bousche which dissolves in the well hole, which hole was analogized to the annular space of the present application, is not present or operative during any normal operating condition of the well hole pipe. At several locations, the Bousche specification indicates that the restraint 25 for the expandable membrane 20 is for the purpose of installing the single walled pipe with its sealing membranes into the well hole, and that the restraint on the membranes is removed or rendered inoperative before any normal operating conditions occur. As the specification of Bousche states at col. 2, lines 13-18:

> ...constraining the [resilient sealing] ring in a collapsed position around the tubular [pipe] by means of a tape and/or binder which gradually dissolves in a downward environment; placing the tubular in the inflow region of the well; and allowing the tape and/or binder to dissolve thereby allowing at least part of the resilient sealing ring to expand radially in the annular space...

At column 2, lines 23-29:

> ...each sealing ring has one end which is permanently clamped to the permeable tubular and a resilient lip-shaped other end which is temporarily

> clamped around the tubular during installation of the tubular in the well and which is released after installation such that the resilient lip-shaped other end unfolds itself and expands radially.

At column 2, lines 45-49:

> Thus, after installation and flushing away of the restraining binder or tape the resilient lip-shaped end of the sealing ring will unfold in the annular space between the permeable well tubular and the open hole....

At column 3, lines 19-25 a temporary dissolvable tape is described. At column 3, lines 39-42, the specification reads:

> Fig. 4 shows how the membrane 20 and spring blades 21 are, during descent of the liner into the well [i.e., installation] wrapped around the liner 22 by means of a tape 25 which slowly dissolves downhole.

Fig. 3 of Bousche illustrates the use condition where the membrane 20 is expanded out, that is, the normal operating condition, at which gas flow in the annular space would be blocked. Fig. 4 does not show similar action at all, having no arrows indicating movement of materials, but rather shows a temporary installation condition, not a normal operating condition. Further, there is no suggestion that gas flow through the well hole would be contemplated or accounted for in Bousche.

Thus, Bousche also fails to disclose a seal assembly where "the seal under the normal operating conditions of the inner pipe and the annular space is in a non-sealing position which allows passage of a gas through the seal assembly."

In addition, Bousche does not concern a double walled pipe, but rather concerns a single walled pipe in a well hole. A single walled pipe is not a double walled pipe, and a well hole is not an outer pipe of a double-walled pipe-in-pipe and a single walled pipe has no annular space between two pipes. One skilled in the art would not look to teachings of Bousche in any event when contemplating the design of a seal for a double walled pipe-in-pipe installation. Thus, even if Bousche did disclose the features of claim 1 described above, which it does not, it

would not have been obvious to modify the pipeline of the Innovations Article to include these features.

Thus, neither the Innovations Article nor Bousche show or suggest a seal in the annular space and operable for sealing the annular space, "wherein the seal under the normal operating conditions of the inner pipe and the annular space is in a non-sealing position which allows passage of a gas through the seal assembly," as is required by claim 1.

Accordingly, it is respectfully submitted that claim 1, and the claims depending therefrom, including claims 2-3 and 14-16, are patentable over the cited art.

Objection to Claims 5-13 as dependent on a rejected base claim

Claims 5-13 have been objected to as being dependent on a rejected base claim. Since claims 5-13 depend on claim 1, either directly or indirectly, and since claim 1 is believed to be patentable, as described above, the objection to claims 5-13 should be withdrawn.

For at least the foregoing reasons, allowance of claims 1-3 and 5-16 is requested.

VIII. Conclusion

In light of the remarks herein, it is respectfully submitted that claims 1-3 and 5-16 are patentable over the cited art and are in condition for allowance.

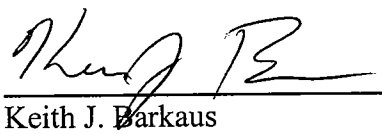
Credit card payment in the amount of $540.00 is submitted via EFS-WEB to cover the 37 C.F.R. §41.20(b)(2) fee for filing an Appeal Brief is enclosed. Any additional fees or charges required at this time in connection with this application may be charged to Patent and Trademark Office Deposit Account No. 15-0700.

If this communication is filed after a shortened statutory time period has elapsed and no separate Petition is enclosed, the Commissioner of Patents and Trademarks is petitioned, under 37 C.F.R. §1.136(a), to extend the time for filing a response to the outstanding Office Action by the number of months which will avoid abandonment under 37 C.F.R. §1.135. The fee under 37 C.F.R. §1.17 should be charged to our Deposit Account No. 15-0700.

In the event the actual fee is greater than the payment submitted or is inadvertently not enclosed or if any additional fee during the prosecution of this application is not paid, the Patent Office is authorized to charge the underpayment to Deposit Account No. 15-0700.

Respectfully submitted,

THIS CORRESPONDENCE IS BEING SUBMITTED ELECTRONICALLY THROUGH THE PATENT AND TRADEMARK OFFICE EFS FILING SYSTEM ON October 29, 2008.



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APPENDIX

The claims on appeal are:

1. (Previously Amended) A seal assembly comprising:

an inner pipe and an outer pipe in a double- walled subsea pipeline, wherein the inner pipe has a normal operating condition wherein it is connected and operable for transmitting a hydrocarbon through the inner pipe;

an annular space formed between the inner pipe and the outer pipe wherein the annular space has a normal operating condition wherein it is connected and operable for permitting gas to pass through the annular space; and

a seal in the annular space and operable for sealing the annular space,

wherein the seal under the normal operating conditions of the inner pipe and the annular space is in a non-sealing position which allows passage of a gas through the seal assembly; and

wherein under the normal operating conditions of the inner pipe and the annular space, the seal is actuatable from the non-sealing position to a sealing position in response to entry of liquid into the annular space.

2. (Previously Presented) A seal assembly according to claim 1 wherein in the non-sealing position, the seal provides an opening past the seal and in the annular space to allow passage of the gas through the seal; and

wherein the seal comprises an annular member defining the opening past the seal and a moveable block operable such that entry of liquid into the annular space causes movement of the block to close the opening in the annular space.

3. (Previously Presented) A seal assembly according to claim 2 wherein the block is moveable under pressure of liquid flow in the annular space.

4. (Canceled)

5. (Previously Presented) A seal assembly according to claim 3 wherein

(a) the annular member comprises one or more orifices ; and

(b) the moveable block comprises a diaphragm and a closure member placed in the annular space such that flow of liquid in the annular space causes movement of the diaphragm and the movement of the diaphragm causes movement of the closure member to close the one or more orifices.

6. (Previously Presented) A seal assembly according to claim 5 wherein the diaphragm and the closure member are both annular in shape around the inner pipe.

7. (Previously Presented) A seal assembly according to claim 2 wherein:

(a) the annular member comprises one or more valves; and

(b) each of the valves comprises one or more orifices and the moveable block such that flow of liquid in the annular space causes movement of the moveable block to close the one or more orifices.

8. (Previously Presented) A seal assembly according to claim 7 wherein each of the valves comprises a blocking plate with an orifice and the moveable block comprises a diaphragm and a closure member, wherein the closure member has apertures such that flow of liquid in the annular space causes movement of the diaphragm which causes movement of the closure member against the blocking plate closing the orifice in the blocking plate and the apertures in the closure member.

9. (Previously Presented) A seal assembly according to claim 7 wherein the moveable block comprises a biased element attached to a closure member and the biased element is held in a biased position by a liquid-sensitive material such that flow of liquid in the annular space causes interaction of the liquid with the liquid-sensitive material causing the liquid-sensitive material to release the biased element so that the biased element effects movement of the closure member to close the one or more orifices.

10. (Previously Presented) A seal assembly according to claim 9 wherein the biased element is a spring.

11. (Previously Presented) A seal assembly according to claim 9 wherein the liquid-sensitive material is a water-soluble salt.

12. (Previously Presented) A seal assembly according to claim 7 wherein the annular member comprises one or more tubes and the one or more valves are situated in the tubes.

13. (Previously Presented) A seal assembly according to claim 2 wherein the annular member is dimensioned so as to extend from an inner wall of the outer pipe to an outer wall of the inner pipe and as to be in sealing contact with each of the inner and the outer walls while the annular member has the opening therein past the seal.

14. (Previously Presented) A seal assembly according to claim 2 wherein

(a) the annular member is dimensioned so that in the normal operating conditions, the annular member is in sealing contact with only one of an inner wall of the outer pipe and an outer wall of the inner pipe so as to provide an opening in the annular space between the annular member and the wall with which ~~it~~ the annular member is not in sealing contact; and

(b) the moveable block comprises a resilient element which is deformable under the pressure of liquid flow in the annular space to close the opening.

15. (Previously Presented) A seal assembly according to claim 14 wherein the annular member has a longitudinal end face which has a recess to define upper and lower arms and wherein one of the arms is the resilient element deformable under the pressure of liquid flow in the annular space to close said opening.

16. (Previously Presented) A seal assembly according to claim 15 further comprising an annular restraint bonded to the upper and lower arms of the annular member.

17. (Canceled)

18. (Canceled)

EVIDENCE APPENDIX

1. **Declaration under 37 C.F.R. §1.132 of Sylvain Denniel.**

P/3203-28

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of Confirmation No.: 3667

Bell et al.

Serial No.: 10/522,471

Filed: May 26, 2007

For: SEAL ASSEMBLY

VIA EFS-WEB
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

DECLARATION OF SYLVAIN DENNIEL UNDER RULE 132

Sir:

Sylvain Denniel declares:

Since January 1997, I have been employed by Coflexip Stena Offshore Ltd., having an office and place of business in Aberdeen, Scotland. In 2003, Coflexip our head company was merged into Technip. S.A. and I am an employee of Technip UK Limited which is a subsidiary of Technip S.A. as well as Technip France S.A another subsidiary of the group.

I am one of the two authors of an article entitled "Innovations Key Reeled Pipe-in-Pipe Flowline" which appeared in the Oil & Gas Journal of August 13, 2001. As the article notes, it was prepared by Gordon Tough and me, based on a Presentation that Coflexip had made to the Offshore Technology Commerce held in Houston, Texas April 30 - May 3, 2001. My educational background and employment history with CSO, that is Coflexip, since January 1997 appears at page 52 of the article. I am still employed by Technip UK Ltd.

The subject of the article is a pipe-in-pipe or double walled pipeline system that was installed in British Petroleum's Nile field located in the Gulf of Mexico off the shore of Texas and Louisiana. Coflexip supplied the pipe installed in the Nile field. It was one of my duties at the time of the installation of the pipeline to demonstrate the integrity and

performance of the Nile field pipe-in-pipe, through a programme of full scale qualification tests. In my position at the time, I observed the pipeline as described in the article, and in particular observed the pipeline as illustrated in the photograph figures in the article. Figure 8 in particular concerns the water stops which seal the annular space between the inner pipe and the outer pipe. Unfortunately, in the only copy of the article we have available, Figure 8 is obscured by the photocopying process. But, I and my co-author worked with and understood the water stops and provided the description of the water stops in that article, particularly the description at pages 50 and 51.

I was aware of the design, construction and assembly of the Nile pipeline as part of my duties, was familiar then with the Nile pipeline in general and with the water stops in the pipeline in particular and I reported in the article about relevant features of the Nile pipeline of which I was then aware. I today remember the water stops on which I report in this Declaration.

The Nile pipeline is what is referred to in the industry as a pipe-in-pipe pipeline which is double walled. It includes an inner pipe through which a hydrocarbon, typically natural gas but possibly also crude oil, can flow from a well head to a transfer point to a carrier. As the hydrocarbon emerging from beneath the sea floor is much warmer than the water surrounding the pipeline deep under the surface of the Gulf of Mexico, the annular space between the inner pipe and the outer pipe is provided with insulation material in order to retain heat in the hydrocarbon and to prevent premature cooling of the hydrocarbon, which could slow its passage through the inner pipe and possibly cause precipitation out and deposition in the pipe of paraffin and solidified "materials". The outer pipe of the pipe in pipe pipeline aims at protecting the insulation material from ingress of water which would destroy the effectiveness of that insulation material. For assembly reasons, an annular space remains between the insulation layer and the inner wall of the outer pipe. However, that annular space was intended to be dry. Further, it was never contemplated that the annular space would be used for or be capable of transmitting gas longitudinally along the annular space.

Over a standard period of use, the Nile pipeline, like any subsea flow line, might be damaged at the outer pipe or a water leak might develop, and water could then enter the annular space through the outer pipe. If the water migration along the annular space

remained unchecked, the water would eventually destroy the effectiveness of the insulation layer, not just at the area of the leak but over a substantial length of the pipeline. To limit such damage to the insulation to a short length of the inner pipe, it was conventional to supply longitudinally spaced apart water stops in the annular space.

Various design water stops are known. The types of water stops of which I had been aware prior to assembly of the Nile pipeline and prior to the 2001 Houston Conference were water stops that when installed in the annular space, were ready to block flow of sea water along the annular space past the water stop. Therefore, the water stops sealed the annular space and were sealed between the outer surface of the inner pipe and the inner surface of the outer pipe. The Nile pipeline had such water stops.

As the article describes, the water stops of the Nile pipeline used the lip seal concept. Each water stop had an annular shape, with a narrower diameter end which was secured to the inner pipe so it would not move along the inner pipe when sea water impinged on it and which extended toward the direction from which the water to be stopped would flow. It had lips or a free end which would normally be self-biased against the inner surface of the outer pipe. The material of the water stops always was biased outwardly so that its lips always touched the outer pipe. In order to accommodate expected relative axial movement between the outer pipe and the inner pipe, onto which the waterstop is mounted, the force exerted by the lip of the water stop onto the inner surface of the outer pipe was sufficient to seal the annular space against gas flow, but not detrimentally high to prevent relative slippage and damage the lips of the water stop consequently. Relative axial movement is expected to be encountered at the assembly, offshore installation and operational stages of the pipeline's design life.

Upon the occurrence of leakage into one section of the outer pipe between two water stops and especially if the leakage was rapid and under the high pressure at the bottom of the Gulf of Mexico, as soon as the leakage water would contact the water stop, there could be a sudden, possibly massive increase of pressure on the water stops and as the article states, then

> ...the seal is energized if the annulus becomes flooded. When pressure is applied, the water-stop lips are forced into the annulus walls, creating a seal.

Hence, while the seal was always in place and would block gas flow, the purpose of the seal of the water stops was to stop the water and so the seal became energized to stop the water flow caused by the presence of the leakage water under hydrostatic pressure in the annular space. As the same text continues:

> The reason for selecting this concept is that the seal is not energized until required, ensuring that the seal exists in an unstressed state until activated by a flooded annulus.

The seal was present. The lips of the seal were pressing against the inside of the outer pipe. But, the seal was not energized or stressed until required, that is, when the water contacted the seal.

It is apparent that, if the lip seal of the water stops was not in initial contact with the interior of the outer pipe, and if there was a gap between the seal and the outer pipe, through which gas or liquid could flow, that, when a leakage flow started or when water entered the annular space, the water would have a free passage through the preexisting gap between the lips of the water stops and the outer pipe, and there might be insufficient pressure on the water stops seal to energize the water stops to seal the annular space, meaning that water would flow past the water stop and that the purpose of the water stops would be defeated.

In summary, as a person who has been involved in subsea pipelines and pipe-in-pipe now for many years and in 2001 for several years, I have sufficient personal experience and knowledge and am aware of the knowledge of others in the field of pipeline design, not only persons who worked at Coflexip and work for Technip France, but persons who work for other companies, to believe that it would be apparent to me and to them that the water stops described in my article would extend between the inner pipe and the outer pipe and that they would not include any means that would permit the flow of gas along the annular space and past the water stops as, in my opinion, such persons of skill in this art would recognize that such a gas transmission means would defeat the purpose of the water stops.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the

like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of this Declaration, the United States patent application for which this Declaration is being supplied and any patent that issues thereon.

Dated: 29-February-2008

SYLVAIN DENNIEL

RELATED PROCEEDINGS APPENDIX

None